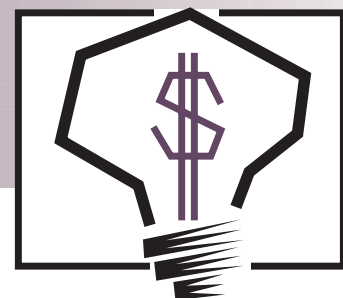


# INVENTIONS & INNOVATION

## Success Story



### V-PLUS™ REFRIGERANT OIL COOLING SYSTEM

#### Refrigerant Oil Cooling System Cuts Energy Use 2% to 5%

##### Benefits

- ◆ Has saved 751 billion Btu cumulatively through 2000
- ◆ Reduces the horsepower requirement by 2% to 5%, depending on configuration and operating characteristics, and reduces electricity use by 2% to 5% for refrigeration and cooling
- ◆ Has avoided 50,000 tons of CO<sub>2</sub> emissions through 2000
- ◆ Improves compressor operation and life and raises compressor capacity compared with systems that inject refrigerant into the compressor
- ◆ Has saved \$10.5 million in energy purchases through 2000

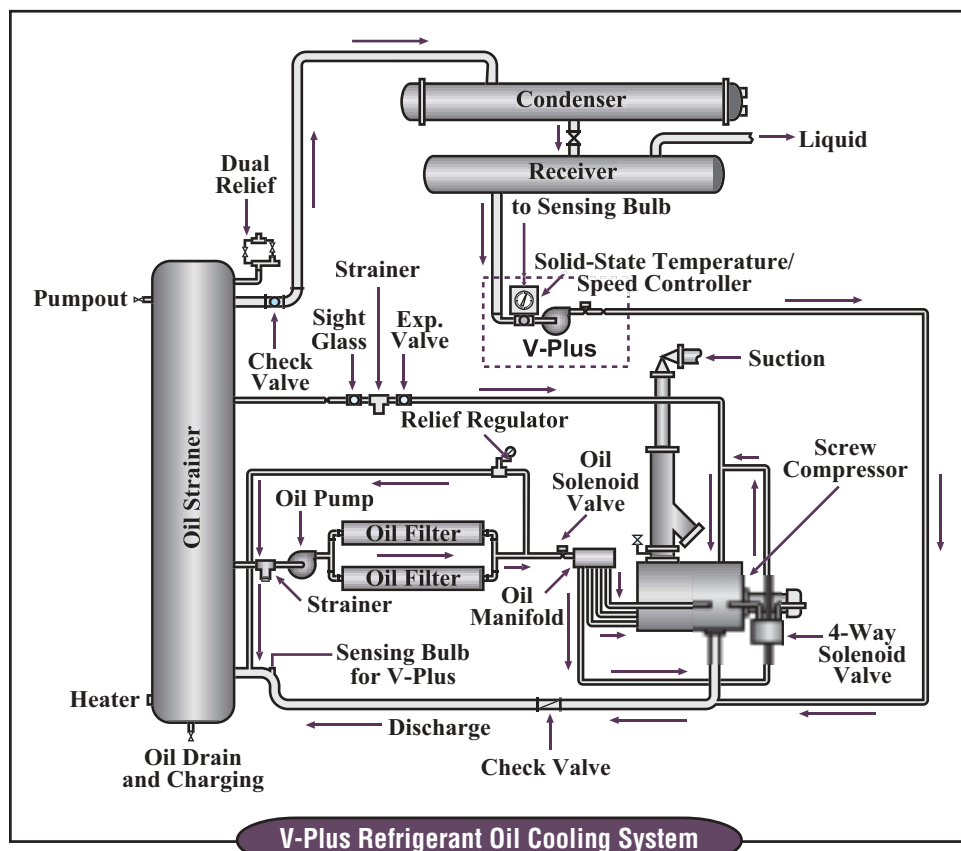
##### Applications

Agriculture sector refrigeration systems for food processing and storage. Climate control systems for industrial, commercial, and institutional buildings

##### Capabilities

Can be retrofit to any medium to large compressor-driven refrigeration or cooling system to raise compressor capacity, cut duty cycle, and increase system efficiency.

The Vilter Manufacturing Corporation, with assistance from the U.S. Department of Energy's Inventions and Innovation Program, proved that adding its refrigerant pump system, the V-Plus System, to screw compressors for industrial refrigeration and cooling systems increases system capacity, extends system lifetime, and saves energy. Vilter's single-screw compressor is a rotary, oil-injected, positive-displacement machine that can operate with commonly used industrial refrigerants. The compressor consists of a cylindrical main screw with six helical grooves and two planar gaterotors. The gaterotors engage with the main screw to form the compressor chamber. Vilter also offers dual-screw compressor system packages with this technology. Further, the V-Plus System can be added to other types of compressor-driven refrigeration systems.



## Technology Description

The invention saves energy and increases screw compressor life by injecting refrigerant liquid into the outlet stream of the compressor to cool the lubricant oil. In addition to cutting the horsepower needed for the compressor by 2% to 5%, the oil cooling increases compressor longevity because no capacity is sacrificed like that in compressor refrigerant injection systems. This system is cheaper to install than "after cooler" external water-cooling systems and is less costly to operate.

## Energy Savings and System Economics

Vilter's single-screw compressor can be retrofit to any medium to large compressor-driven refrigeration or cooling systems to raise compressor capacity, cut duty cycle, and increase system efficiency.

Over 210 V-Plus units are operating worldwide, 204 in the United States. Compared with conventional refrigeration systems in the same applications, cumulative energy savings through the year 2000 have surpassed 751 billion Btu with 50,000 tons in associated reductions of CO<sub>2</sub> emissions. The V-Plus Systems reduce electricity use by 2% to 5% for refrigeration and cooling, with avoided energy purchases totaling over \$10.5 million through 2000.



The Inventions and Innovation Program works with inventors of energy-related technologies to establish technical performance and to conduct early development. Ideas that have significant energy-savings impact and market potential are chosen for financial assistance through a competitive solicitation process. Technical guidance and commercialization support are also extended to successful applicants.

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